

Please provide the following information, and submit to the NOAA DM Plan Repository.

Reference to Master DM Plan (if applicable)

As stated in Section IV, Requirement 1.3, DM Plans may be hierarchical. If this DM Plan inherits provisions from a higher-level DM Plan already submitted to the Repository, then this more-specific Plan only needs to provide information that differs from what was provided in the Master DM Plan.

URL of higher-level DM Plan (if any) as submitted to DM Plan Repository:

1. General Description of Data to be Managed**1.1. Name of the Data, data collection Project, or data-producing Program:**

Water chemistry and Conductivity-Temperature-Depth (CTD) profiles at coral reef sites in Batangas, Philippines from discrete surface and bottom water samples collected from 2012 to 2015

1.2. Summary description of the data:

Laboratory experiments reveal calcification rates of crustose coralline algae (CCA) are strongly correlated to seawater aragonite saturation state. Predictions of reduced coral calcification rates, due to ocean acidification, suggest that coral reef communities will undergo ecological phase shifts as calcifying organisms are negatively impacted by changing seawater chemistry.

The water chemistry data described here are from discrete water samples collected by the NOAA Coral Reef Ecosystem Program (CREP) to assess the seawater carbonate systems at fixed climate survey sites located in coral reef habitats in the Philippines in 2012, 2013, and 2015. Climate sites were established by CREP to assess multiple features of the coral reef environment (in addition to the data described herein) over time.

SCUBA divers collected two discrete water samples from each site; one at the reef and one at the surface directly above the reef. The samples were processed by CREP and sent to NOAA Pacific Marine Environmental Laboratory (PMEL) to be analyzed for total alkalinity (TA) and dissolved inorganic carbon (DIC). From these constituents, alongside temperature, salinity, and depth data, other parameters of the seawater carbonate system can be calculated.

Additionally in 2015, conductivity-temperature-depth (CTD) casts were also performed to characterize the spatial structure of the physical and chemical properties of the ocean environment influencing the living coral reef resources observed during climate site surveys. Data are collected by lowering the CTD in a profiling mode from a small boat, resulting in vertical profiles (max 18 meter depth, downcast only) of water column conductivity, temperature, and pressure. Vertical profiles of temperature, salinity, and turbidity resulting from CTD casts provide indicators for local sea water chemistry changes.

These water chemistry and CTD data provide a baseline for tracking reef carbonate system changes due to globally increasing levels of atmospheric carbon dioxide. The data can be accessed online via the NOAA National Centers for Environmental Information (NCEI) Ocean Archive.

In addition to these discrete samples, water samples were collected as part of CREP's ocean acidification diurnal suite, which also includes vertical profiles from CTD casts, current direction and magnitude from an Acoustic Doppler Current Profiler, and pH from an SeaFET sensor. The data associated with the diurnal suite are documented and archived separately.

1.3. Is this a one-time data collection, or an ongoing series of measurements?

One-time data collection

1.4. Actual or planned temporal coverage of the data:

2015-05-18 to 2015-06-12, 2012-03-12 to 2012-03-16, 2013-02-01 to 2013-02-04

1.5. Actual or planned geographic coverage of the data:

W: 120.87, E: 120.9, N: 13.728054, S: 13.658594

Five survey locations in the municipalities of Mabini and Tingloy in Batangas, Philippines (near the Verde Island Passage), including Batong Buhay, Koala Reserve Area, Arthur's Reef, Twin Rocks, and Batalang Bato.

1.6. Type(s) of data:

(e.g., digital numeric data, imagery, photographs, video, audio, database, tabular data, etc.)

Table (digital)

1.7. Data collection method(s):

(e.g., satellite, airplane, unmanned aerial system, radar, weather station, moored buoy, research vessel, autonomous underwater vehicle, animal tagging, manual surveys, enforcement activities, numerical model, etc.)

Instrument: CTD

Platform: Not applicable

Physical Collection / Fishing Gear: Niskin bottles

1.8. If data are from a NOAA Observing System of Record, indicate name of system:

1.8.1. If data are from another observing system, please specify:

2. Point of Contact for this Data Management Plan (author or maintainer)

2.1. Name:

Annette M DesRochers

2.2. Title:

Metadata Contact

2.3. Affiliation or facility:

Pacific Islands Fisheries Science Center

2.4. E-mail address:

annette.desrochers@noaa.gov

2.5. Phone number:

(808)725-5461

3. Responsible Party for Data Management

Program Managers, or their designee, shall be responsible for assuring the proper management of the data produced by their Program. Please indicate the responsible party below.

3.1. Name:

Charles W Young

3.2. Title:

Data Steward

4. Resources

Programs must identify resources within their own budget for managing the data they produce.

4.1. Have resources for management of these data been identified?

Yes

4.2. Approximate percentage of the budget for these data devoted to data management (specify percentage or "unknown"):

Unknown

5. Data Lineage and Quality

NOAA has issued Information Quality Guidelines for ensuring and maximizing the quality, objectivity, utility, and integrity of information which it disseminates.

5.1. Processing workflow of the data from collection or acquisition to making it publicly accessible

(describe or provide URL of description):

Lineage Statement:

NOAA Coral Reef Ecosystem Program (CREP) assembles carbonate chemistry information from discrete seawater samples analyzed for two parameters: 1) Dissolved Inorganic Carbon (DIC), which in some literature is defined as Total Carbon (CT), and 2) Total Alkalinity (TA or AT). The carbonate system is influenced by seawater salinity, temperature, pressure, and the dissolved nutrients silicate (SiO₄⁴⁻) and phosphate (PO₄³⁻). All carbonate system collection and measurement methodologies follow the protocols accepted by the greater scientific community and outlined in Dickson et al. (2007)

Process Steps:

- Discrete water samples are collected according to the protocol established by the

NOAA Pacific Marine Environmental Laboratory (PMEL). (Citation: Inorganic Carbon Sampling: Planning and Sample Collection)

- NOAA Coral Reef Ecosystem Program (CREP) collects supplementary salinity, temperature, and pressure values by deploying a Seabird Electronics SBE-19plus CTD in concert with every discrete seawater sample collection.

- NOAA Pacific Marine Environmental Laboratory (PMEL) supports NOAA Coral Reef Ecosystem Program's (CREP's) carbonate chemistry sampling through the laboratory analysis of dissolved inorganic carbon (DIC) and total alkalinity (TA), provision of the sample bottles and transport cases, and technical consultation. The source document contains the protocols that PMEL uses to analyze water samples for DIC and TA. (Citation: Dickson, A.G., Sabine, C.L. and Christian, J.R. (Eds.) 2007. Guide to best practices for ocean CO₂ measurements. PICES Special Publication 3, 191 pp.)

- The Total Alkalinity (TA) analysis employs a two-stage, potentiometric, open-cell titration using coulometrically analyzed HCl. (Citation: Dickson et al (2007), SOP 3b: Determination of total alkalinity in sea water using an open-cell titration)

- The CTD package is deployed off a small boat using a hand line. The CTD is held just under the surface for 1 minute to cycle water through the instrument and tubing. Afterwards the CTD is lowered at an even pace to near the bottom depth (max 18 m). A GPS waypoint is taken at the beginning of the cast to mark the position and time. (Citation: Coral reef ecosystem integrated observing system: In-situ oceanographic observations at the US Pacific islands and atolls)

- The raw data are processed by the SeaBird data processing software (<http://www.seabird.com/software/sbe-data-processing>) using the following steps: 1) Data conversion, 2) Filter, 3) AlignCTD, 4) Loop Edit, 5) Derive, 6) Bin Average. Each header in the raw and processed files is manipulated to include the latitude, longitude, and date/time (in UTC) of the cast. The result is a standard ascii .cnv file, in addition to the raw .hex file. The data are then ingested into an Access database. (Citation: Coral reef ecosystem integrated observing system: In-situ oceanographic observations at the US Pacific islands and atolls)

5.1.1. If data at different stages of the workflow, or products derived from these data, are subject to a separate data management plan, provide reference to other plan:

5.2. Quality control procedures employed (describe or provide URL of description):

CTD: The data is quality controlled by CREP personnel after the data is downloaded from the instrument.

Water Samples: PMEL conducts quality assurance and quality control on their analyses; the precision and accuracy of DIC analyses are on the order of $\pm 0.05\%$ and TA analyses are on the order of $\pm 0.1\%$ in a laboratory setting.

Data quality flags are provided by NOAA Pacific Marine Environmental Laboratory (PMEL) and included in the dataset. These flags indicate if something went wrong with

the analytical equipment or with the processing of the samples. PMEL uses the World Ocean Circulation Experiment (WOCE) data quality flag system, where '2's correspond to good values, '3's to questionable data, and '4's to bad data. Most water samples collected by the NOAA Coral Reef Ecosystem Program (CREP) and analyzed by PMEL in this dataset received a '2' data quality flag and the remainder were flagged as questionable ('3').

6. Data Documentation

The EDMC Data Documentation Procedural Directive requires that NOAA data be well documented, specifies the use of ISO 19115 and related standards for documentation of new data, and provides links to resources and tools for metadata creation and validation.

6.1. Does metadata comply with EDMC Data Documentation directive?

Yes

6.1.1. If metadata are non-existent or non-compliant, please explain:

6.2. Name of organization or facility providing metadata hosting:

NMFS Office of Science and Technology

6.2.1. If service is needed for metadata hosting, please indicate:

6.3. URL of metadata folder or data catalog, if known:

<https://inport.nmfs.noaa.gov/inport/item/45817>

6.4. Process for producing and maintaining metadata

(describe or provide URL of description):

Metadata produced and maintained in accordance with the NMFS Data Documentation Procedural Directive: <http://www.nmfs.noaa.gov/op/pds/documents/04/111/04-111-01.pdf>

7. Data Access

NAO 212-15 states that access to environmental data may only be restricted when distribution is explicitly limited by law, regulation, policy (such as those applicable to personally identifiable information or protected critical infrastructure information or proprietary trade information) or by security requirements. The EDMC Data Access Procedural Directive contains specific guidance, recommends the use of open-standard, interoperable, non-proprietary web services, provides information about resources and tools to enable data access, and includes a Waiver to be submitted to justify any approach other than full, unrestricted public access.

7.1. Do these data comply with the Data Access directive?

Yes

7.1.1. If the data are not to be made available to the public at all, or with limitations, has a Waiver (Appendix A of Data Access directive) been filed?

7.1.2. If there are limitations to public data access, describe how data are protected from unauthorized access or disclosure:

7.2. Name of organization of facility providing data access:

National Centers for Environmental Information - Silver Spring, Maryland

7.2.1. If data hosting service is needed, please indicate:

7.2.2. URL of data access service, if known:

https://www.nodc.noaa.gov/archive/arc0081/0137093/1.1/data/0-data/dic_sample_technique_revised_

https://www.nodc.noaa.gov/archive/arc0081/0137093/1.1/data/0-data/Guide_all_in_one.pdf

<http://accession.nodc.noaa.gov/0162832>

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https://www.nodc.noaa.gov/archive/arc0081/0137093/1.1/data/0-data/Hoeke_etal_JOO_2009.pdf

7.3. Data access methods or services offered:

Data can be accessed online via the NOAA National Centers for Environmental Information (NCEI) Ocean Archive.

7.4. Approximate delay between data collection and dissemination:

Unknown

7.4.1. If delay is longer than latency of automated processing, indicate under what authority data access is delayed:

8. Data Preservation and Protection

The NOAA Procedure for Scientific Records Appraisal and Archive Approval describes how to identify, appraise and decide what scientific records are to be preserved in a NOAA archive.

8.1. Actual or planned long-term data archive location:

(Specify NCEI-MD, NCEI-CO, NCEI-NC, NCEI-MS, World Data Center (WDC) facility, Other, To Be Determined, Unable to Archive, or No Archiving Intended)

NCEI-MD

8.1.1. If World Data Center or Other, specify:

8.1.2. If To Be Determined, Unable to Archive or No Archiving Intended, explain:

8.2. Data storage facility prior to being sent to an archive facility (if any):

Pacific Islands Fisheries Science Center - Honolulu, HI

8.3. Approximate delay between data collection and submission to an archive facility:

Unknown

8.4. How will the data be protected from accidental or malicious modification or deletion prior to receipt by the archive?

Discuss data back-up, disaster recovery/contingency planning, and off-site data storage relevant to the data collection

The data resides in an MS Access database, which is maintained and regularly backed up by PIFSC ITS.

9. Additional Line Office or Staff Office Questions

Line and Staff Offices may extend this template by inserting additional questions in this section.